# PLANTERS' BULLETIN

## OF THE RUBBER RESEARCH INSTITUTE OF MALAYA

PLANTERS' BULLETIN FORTY-NINE

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Price
50 Cents

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# RRI

LOCATION. The Institute's laboratories and offices at the third mile, Ampang Road, Kuala Lumpur are open from 8 am to 1 pm and 2 pm to 4 pm on Mondays to Fridays, and from 8 am to 12.30 pm on Saturdays.

EXPERIMENT STATION AND FACTORY. This station of the RRI is situated 16 miles from Kuala Lumpur, at Sungei Buloh on the Kuala Lumpur — Kepong — Kuala Selangor road. Visits may be made on Mondays or Wednesdays by arrangement. There is a guest house.

CORRESPONDENCE. All LETTERS must be addressed to the Director, Rubber Research Institute of Malaya, Post Office Box 150, Kuala Lumpur. Special enquiries may be marked for the attention of particular officers. The address for TELEGRAMS is Searching, Kuala Lumpur. TELEPHONE: Kuala Lumpur 72051. PARCELS occasionally arrive without any indication of their origin. Senders' names and addresses should be written clearly on the outside of all packages, and advice of despatch should be given by letter or telegram.

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ADVICE. Enquiries are invited from rubber producers in the Federation of Malaya, Singapore, the colony of North Borneo, and the territories of Sarawak, Brunei and Nigeria, who may require more detailed information applicable to their own special problems. Where it is considered necessary, visits will be made to estates in Malaya as convenient. Visits to estates in other territories are by special arrangement. The only visits for which charges are normally made are those of our clone indentification inspectors. INTERVIEWS should be arranged by letter, as members of the senior research and advisory staff are frequently absent on visits to plantations.

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# PLANTERS' BULLETIN

OF THE RUBBER RESEARCH INSTITUTE OF MALAYA

Kuala Lumpur July 1960 Number 49

## Editorial: Technical Service to the Malayan Rubber Manufacturer

Synthetic rubber producers provide a full technical advisory service to their customers in Europe and the U.S.A., helping them to use the synthetic material to the best advantage. Natural rubber producers have recognised the need to provide a similar service to manufacturers. As a result, our colleagues at the British Rubber Producers' Research Association began such a service* almost two years ago and have now visited the majority of rubber users in Great Britain. From reports of a natural rubber technical service to manufacturers in the U.S.A., started in February of this year, it is already evident that renewed interest in natural rubber has been aroused there. We believe that a similar service in this country will be of value to manufacturers here and, indirectly, to Malayan rubber producers.

In the past, a direct service to rubber manufacturers has not been possible because of shortage of staff and equipment. Enquiries were answered by the local Natural Rubber Development Board office by reference to published literature, or, when this was impossible, by reference to the B.R.P.R.A. or R.R.I.M. With the improved facilities recently made available, we now offer a comprehensive Technical Advisory Service to rubber users in Malaya. Enquiries may be made directly to the Institute and, where necessary, our technologists will visit the factories concerned. The N.R.D.B. will continue to deal with those enquiries which can be met by reference to existing literature.

### THE NEED FOR A TECHNICAL SERVICE IN MALAYA

In Malaya many manufacturers are handicapped in that they do not have their own laboratory facilities. Furthermore, difficulty in obtaining access to published scientific information restricts knowledge of the latest advances in rubber technology and factory procedure. Even if such knowledge were easily available, the busy factory manager, whose main concern is to maintain the level of production, would find little opportunity to try out new methods. The Technical Service now available offers the Malayan manufacturing industry the services of experienced technologists in this country, aided by advice from the B.R.P.R.A.

* described in our *Editorial* in *Planters' Bulletin 45*, November 1959.

THE NATURE AND FUNCTION OF THE NEW SERVICE

A manufacturer, both here and abroad, often feels that his particular methods are the best and wishes to keep his special formula a secret. Nevertheless, there are certain to be occasions when we can suggest ways in which compounds and processes can be improved, provided of course, that the manufacturer will take us into his confidence. This he can do without any risk that details of his procedures will be conveyed to competitors—our Technical Service is essentially a confidential one.

Besides bringing present knowledge to bear upon manufacturing problems, the Research Institute sometimes has new materials to offer the user. Superior Processing rubber is an example; it is a modified rubber which is of considerable value in making extruded goods. Our technologists can suggest such materials and can demonstrate their advantages in the factory. Another important part of our service will be to conduct tests on rubber quality and to suggest remedies for defects. When a user has a technical complaint against his natural rubber supplies we can help to overcome the difficulty by contacting the supplier. If rubber goods have to meet a technical specification, we can advise how best to comply with the requirements, and where a manufacturer does not possess the necessary testing equipment we are willing to carry out the necessary tests for him. Normal enquiries, and the laboratory tests which arise from them, are carried out free of charge, but in the case of tests on a routine basis we charge a fee.

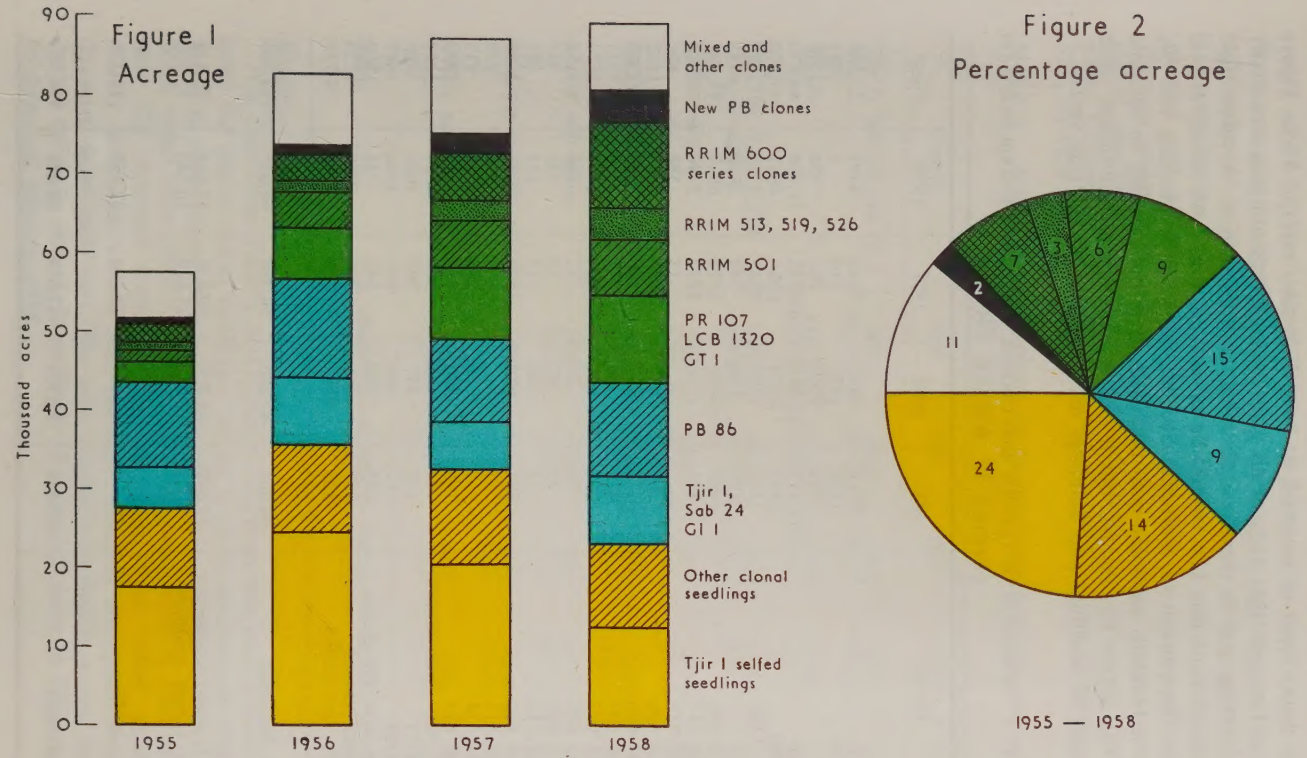
Manufacturers using Malaya's principal commodity have an important part to play in the expansion of the national economy. It is hoped that those who are contemplating improvements in their factory processes will make full use of the services we offer.

# Planting Materials Used in Malaya, 1955-8

IN OUR EDITORIAL in *Planters' Bulletin 47*, we described recent progress made in planting and replanting rubber. At the same time we were able to demonstrate the increased use of higher yielding material in Malaya over the period 1955 to 1958.

Now, with the aid of figures made available to us by the Department of Statistics, we are able to make a further analysis of the main trends in the use of various types of clonal and seedling material and to show how the proportions in which these materials are used vary according to type of holding and geographical situation. The figures are compiled from a return submitted by estates, and the majority of the comments that follow refer to estates.

When considering the figures, it should be borne in mind that there are two common defects in the completion of the questionnaires on which they are based. First, many estates enter small areas, presumably




*Figures 1 and 2. Figure 1 shows the acreages planted and replanted with various clones and seedlings in 1955-8. Figure 2 shows the percentage distribution of the clones and seedlings over the total area planted and replanted in the same period.*

under newer types of material, as 'mixed' in their returns. From Figure 2, it will be seen that 11% of all plantings and replantings comes under this heading and is therefore of unknown composition. A more rigid classification of this 11% would be of assistance to both ourselves and to the Department of Statistics. Second, the year of planting and the year of budding are sometimes confused. It is not possible to estimate to what degree this occurs, but it clearly causes some confusion when acreages of seedlings and buddings are compared in any one year.

TABLE 1. ACREAGES OF CLONES AND CLONAL SEEDLINGS ESTABLISHED ON ESTATES IN MALAYA, 1955—8

| *Clone* | *1955* | *1956* | *1957* | *1958* | *Total* |
|---|---|---|---|---|---|
| Tjir 1 | 3211 | 6447 | 5143 | 7793 | 22,594 |
| Sab 24 | 1186 | 1020 | 510 | 5 | 2721 |
| Gl 1 | 503 | 1009 | 282 | 924 | 2718 |
| PB 86 | 11,132 | 12,782 | 10,722 | 11,934 | 46,570 |
| PR 107 | 2195 | 4510 | 6004 | 4661 | 17,370 |
| LCB 1320 | 394 | 1393 | 2011 | 3322 | 7120 |
| GT 1 | 128 | 624 | 743 | 2898 | 4393 |
| RRIM 501 | 1483 | 4482 | 5773 | 6947 | 18,685 |
| RRIM 513 | 902 | 1318 | 1972 | 2740 | 6932 |
| RRIM 519 | – | – | 15 | 586 | 601 |
| RRIM 526 | 106 | 217 | 486 | 633 | 1442 |
| RRIM 600 | 172 | 114 | 360 | 563 | 1209 |
| RRIM 603 | 422 | 965 | 1171 | 2765 | 5323 |
| RRIM 605 | 294 | 691 | 764 | 1795 | 3544 |
| RRIM 606 | 26 | 20 | 32 | 104 | 182 |
| RRIM 607 | 75 | 62 | 79 | 325 | 541 |
| RRIM 610 | 73 | 46 | 12 | 151 | 282 |
| RRIM 612 | 391 | 654 | 1598 | 1013 | 3656 |
| RRIM 613 | 3 | – | – | 236 | 239 |
| RRIM 614 | 9 | 6 | 250 | 648 | 913 |
| RRIM 623 | 195 | 426 | 813 | 2516 | 3950 |
| Other 600 series clones | 724 | 545 | 986 | 897 | 3152 |
| PB 5/51 | 142 | 443 | 789 | 1644 | 3018 |
| PB 5/63 | 84 | 340 | 847 | 1394 | 2665 |
| Other new PB clones | 193 | 340 | 542 | 735 | 1810 |
| Chemara clones | 199 | 141 | 325 | 1055 | 1720 |
| Others and mixed | 5823 | 8685 | 12,501 | 7741 | 34,750 |
| Total buddings | 30,065 | 47,280 | 54,730 | 66,025 | 198,100 |
| Tjir 1 clonal seedlings | 17,652 | 24,723 | 20,445 | 12,514 | 75,334 |
| Other clonal seedlings | 9947 | 10,762 | 11,849 | 10,343 | 42,901 |
| Total seedlings | 27,599 | 35,485 | 32,294 | 22,857 | 118,235 |
| Grand total | 57,664 | 82,765 | 87,024 | 88,882 | 316,335 |

## PLANTING MATERIAL USED ON ESTATES

Tables 1 and 2 and *Figure 1* show the amount and type of planting material used in each year in the period 1955 to 1958. *Figure 2* shows the total figures for these years expressed as a percentage of the total planted and replanted area. Considering first the broad division of planting material into clonal seedlings and buddings, the percentage of clonal seedlings in plantings and replantings has decreased over the years. Correspondingly, the percentage of buddings has increased, from 52% in 1955 to 74% in 1958.

TABLE 2. ACREAGES OF GROUPS OF CLONES ESTABLISHED ON ESTATES IN MALAYA, 1955—8

| *Clones* | *1955* | *1956* | *1957* | *1958* | *Total* |
|---|---|---|---|---|---|
| Tjir 1, Sab 24 and Gl 1 | 4900<br>16.3% | 8476<br>17.9% | 5935<br>10.8% | 8722<br>13.2% | 28,033<br>14.2% |
| PB 86 | 11,132<br>37.0% | 12,782<br>27.0% | 10,722<br>19.6% | 11,934<br>18.1% | 46,570<br>23.5% |
| PR 107, LCB 1320 and GT 1 | 2717<br>9.0% | 6527<br>13.8% | 8758<br>16.0% | 10,881<br>16.5% | 28,883<br>14.6% |
| RRIM 501 | 1483<br>4.9% | 4482<br>9.5% | 5773<br>10.5% | 6947<br>10.5% | 18,685<br>9.4% |
| RRIM 513, 519 and 526 | 1008<br>3.4% | 1535<br>3.2% | 2473<br>4.5% | 3959<br>6.0% | 8975<br>4.5% |
| RRIM 600 series | 2384<br>7.9% | 3529<br>7.5% | 6065<br>11.1% | 11,013<br>16.7% | 22,991<br>11.6% |
| New PB and Ch clones | 618<br>2.1% | 1264<br>2.7% | 2503<br>4.6% | 4828<br>7.3% | 9213<br>4.7% |
| Others and mixed | 5823<br>19.4% | 8685<br>18.4% | 12,501<br>22.8% | 7741<br>11.7% | 34,750<br>17.5% |
| Total | 30,065<br>100% | 47,280<br>100% | 54,730<br>100% | 66,025<br>100% | 198,100<br>100% |

*Seedlings*

It is clear from Table 1 and *Figure 1* that there has been a drift away from the use of clonal seedlings, but on a closer analysis we find that this is to some extent explained by the decline in the use of Tjir 1 seedlings, which were planted on about 17½ thousand acres in 1955 and on only 12½ thousand acres in 1958; the area under 'other' seedlings, mainly from well known seed gardens, remained steady at about 10 thousand acres each year. The area planted with buddings rose sharply during the same period, from about 30 thousand acres in 1955 to over 66 thousand acres in 1958.

*Older Clones*

This group which comprises PB 86, Tjir 1, Sab 24, and Gl 1, made up 53.3% of the total clonal replantings in 1955 but the figure had fallen to 31.3% by 1958. Reference to Table I shows that the *acreages* under these clones has shown some increase over the period as a whole. The decline in the *percentage acreage* planted with the older clones is explained by the greater use made of the newer clones during this period of expansion in new planting and replanting. Over the period considered, PB 86 remained the most popular of the older clones.

*Newer Clones*

Of the newer clones, PR 107 and RRIM 501 hold the first place, followed by LCB 1320, RRIM 513 and GT 1. Plantings with RRIM 600 series clones rose sharply in 1958, when it exceeded the acreage under RRIM 501. It should also be remembered that a proportion of the 'mixed' area probably consists of RRIM 600 series clones, together with the newer Prang Besar clones and Chemara clones. The most popular of RRIM 600 series clones were 603, 605, 612 and 623.

## EUROPEAN AND ASIAN-OWNED ESTATES

The contribution of Asian-owned Estates to the total acreage planted and replanted has been rising over the four years under consideration, from 26.3% in 1955 to 35.5% in 1958. Of the total area planted by Asian-owned Estates, 58.7% has been budded while on European-owned Estates 64.4% has been budded. It thus appears that there is little difference in the general type of planting material used on Asian- and European-owned Estates. When we consider the specific clones and seedlings (Table 3) used, we find that the Asian estates are slightly more conservative in their choice of material.

*Seedlings*

Asian-owned Estates obtain 72.8% of all seedlings from approved areas of clone Tjir 1, while European-owned Estates obtain only 59.0% of all seedlings from these areas. Asian estates therefore use less of the seedling material from the well-known seed gardens.

*Older Clones*

Of the older clones, PB 86 is less popular with Asian-owned Estates, being planted over only 18.8% of their total budded area, than on European-owned Estates, where it has been planted on 25.4% of the budded area. Clone Tjir 1 is the more popular clone with Asian-owned Estates.

*Newer Clones*

The percentage of the budded acreage under the newer clones is 47.0% for European as against 36.3% for Asian-owned Estates. However, clone RRIM 501 is more used by Asian-owned Estates, occupying

TABLE 3. USE OF GROUPS OF CLONES AND SEEDLINGS ON EUROPEAN AND ASIAN-OWNED ESTATES. TOTAL ACREAGE FOR 1955 — 8

| *Clones* | *European* | *Asian* | *Total* |
|---|---|---|---|
| Tjir 1, Gl 1 and Sab 24 | 15,622<br>11.1% | 12,411<br>21.6% | 28,033<br>14.2% |
| PB 86 | 35,738<br>25.4% | 10,832<br>18.8% | 46,570<br>23.5% |
| PR 107 | 12,130<br>8.6% | 5241<br>9.1% | 17,371<br>8.8% |
| LCB 1320 | 5282<br>3.8% | 1837<br>3.2% | 7119<br>3.6% |
| GT 1 | 4145<br>2.9% | 248<br>0.4% | 4393<br>2.2% |
| RRIM 501 | 11,954<br>8.5% | 6735<br>11.7% | 18,685<br>9.4% |
| RRIM 513, 519 and 526 | 7010<br>5.0% | 1965<br>3.4% | 8975<br>4.5% |
| RRIM 600 series | 18,664<br>13.3% | 4327<br>7.5% | 22,991<br>11.6% |
| PB and Ch clones | 8438<br>6.0% | 755<br>1.3% | 9213<br>4.7% |
| Others and Mixed | 21,616<br>15.4% | 13,134<br>22.8% | 34,750<br>17.5% |
| Total clones | 140,595<br>100% | 57,500<br>100% | 198,100<br>100% |
| Tjir 1 seedlings | 45,875<br>59.0% | 29,459<br>72.8% | 75,334<br>63.7% |
| Other seedlings | 31,881<br>41.0% | 11,020<br>27.2% | 42,901<br>36.3% |
| Total seedlings | 77,756<br>100% | 40,479<br>100% | 118,235<br>100% |
| Grand total | 218,351 | 97,984 | 316,335 |

11.7% of the budded acreage, than by European-owned Estates, where it occupies 8.5% of the acreage. RRIM 600 series clones have been used on 13.3% of the budded area of European and on 7.5% of the budded area of Asian-owned Estates.

## COMPARISON OF THE MAIN PLANTING AREAS IN MALAYA

It is interesting to observe that in Negri Sembilan and Malacca 70.7% of the plantings or replantings on estates are budded (52,222 acres),

TABLE 4. ACREAGE OF CLONES AND SEEDLINGS USED ON ESTATES IN THE VARIOUS STATES OF MALAYA. TOTAL FOR 1955 — 8

| *Clones* | *Johore and S'pore* | *N.S'lan and Malacca* | *S'gor* | *Perak, Kedah, Penang and P.Wellesley* | *Pahang T'ganu and K'tan* | *Total Malaya* |
|---|---|---|---|---|---|---|
| Tjir 1, Gl 1 and Sab 24 | 9048<br>18.7% | 6554<br>12.6% | 2785<br>7.6% | 8564<br>17.0% | 1082<br>10.5% | 28,033<br>14.2% |
| PB 86 | 6838<br>14.1% | 11,184<br>21.4% | 10,891<br>29.6% | 14,916<br>29.6% | 2741<br>26.6% | 46,570<br>23.5% |
| PR 107 | 5187<br>10.7% | 2494<br>4.8% | 2804<br>7.6% | 6022<br>12.0% | 864<br>8.4% | 17,371<br>8.8% |
| LCB 1320 | 2170<br>4.5% | 1634<br>3.1% | 437<br>1.2% | 2703<br>5.4% | 175<br>1.7% | 7119<br>3.6% |
| GT 1 | 887<br>1.8% | 952<br>1.8% | 1670<br>4.5% | 682<br>1.4% | 202<br>2.0% | 4393<br>2.2% |
| RRIM 501 | 5206<br>10.7% | 5404<br>10.3% | 4019<br>10.9% | 3377<br>6.7% | 679<br>6.6% | 18,685<br>9.4% |
| RRIM 513, 519 and 526 | 2943<br>6.1% | 2111<br>4.0% | 2025<br>5.5% | 1546<br>3.1% | 350<br>3.4% | 8975<br>4.5% |
| RRIM 600 series | 6586<br>13.6% | 5917<br>11.3% | 3460<br>9.4% | 4975<br>9.9% | 2053<br>19.9% | 22,991<br>11.6% |
| PB and Ch clones | 1685<br>3.5% | 3317<br>6.4% | 1595<br>4.3% | 2392<br>4.8% | 224<br>2.2% | 9213<br>4.7% |
| Others and mixed | 7939<br>16.4% | 12,655<br>24.2% | 7093<br>19.3% | 5138<br>10.2% | 1925<br>18.7% | 34,750<br>17.5% |
| Total clones | 48,489<br>100% | 52,222<br>100% | 36,779<br>100% | 50,315<br>100% | 10,295<br>100% | 198,100<br>100% |
| Tjir 1 seedlings | 20,858<br>64.4% | 11,353<br>52.4% | 14,932<br>66.9% | 18,998<br>61.4% | 9193<br>84.4% | 75,334<br>63.7% |
| Other seedlings | 11,548<br>35.6% | 10,314<br>47.6% | 7390<br>33.1% | 11,947<br>38.6% | 1702<br>15.6% | 42,901<br>36.3% |
| Total seedlings | 32,406<br>100% | 21,667<br>100% | 22,322<br>100% | 30,945<br>100% | 10,895<br>100% | 118,235<br>100% |
| Grand total | 80,895 | 73,889 | 59,101 | 81,260 | 21,190 | 316,335 |

against some 60% in the other States. In the same area, 47.6% of the seedlings trees in the group are 'other than Tjir 1', against 35% in other States. Employment of improved material is thus relatively advanced in these States (See Table 4).

If we consider budded areas alone, we find that the highest percentage of newer clonal material is found in Johore plantings and replantings, i.e. 49.7% of the budded area against some 40% in other States. In addition, clone PR 107 seems more popular in Johore, Kedah and Perak, than in Selangor.

Of the older clones, PB 86 is more popular in Selangor, Perak and Kedah (occupying on average 29% of the area planted with buddings) than in Johore which has an average of 14%. No doubt this is related to the less satisfactory performance of PB 86 in Johore.

The highest percentage of RRIM 600 series clones is found in the Pahang/Trengganu/Kelantan group of States, where 32.7% of the new clearings and replantings on European-owned Estates is planted with these clones, the average over the whole of Malaya being 11.6%.

## SMALLHOLDERS

It is unfortunate that no comparable figures showing the use of clones and seedlings by Smallholders are available, but in Table 5 we have attempted to estimate the acreages replanted with various clones over the period 1956-8, under the Rubber Industry (Replanting) Board Fund B scheme. They are based on the returns of budwood distributed to smallholders, quoted in the Annual Reports of the R.I.R.B., and we

TABLE 5. ESTIMATED ACREAGE REPLANTED WITH VARIOUS CLONES ON SMALLHOLDINGS, 1956 — 8*

| *Clones* | *1956* | *1957* | *1958* |
|---|---|---|---|
| Tjir 1 | 2300 | 2100 | 2100 |
| PB 86 | 5000 | 6100 | 4800 |
| Gl 1 | 100 | 200 | 200 |
| PR 107 | 100 | 400 | 1600 |
| RRIM 501 | 1000 | 1300 | 1600 |
| RRIM 513 | 200 | 500 | 700 |
| Total | 8700 | 10,600 | 11,000 |
| Total acreage replanted | 45,123 | 49,911 | 58,709 |

* Under the R.I.R.B. Fund B Scheme. The Table also shows the total acreage of smallholdings replanted with clones and seedlings.

have assumed that about 20 yards of budwood are used per acre. Only a limited number of clones are used. Nevertheless, as would be expected, there is an increase in the planting of more promising clones.

In Table 5, the total acreage replanted is also given. The difference between the total replanted area and the budded area is made up of approved clonal seedlings, mainly Tjir 1.

### CONCLUSIONS

These figures reinforce the comments made in the editorial in *Planters' Bulletin 47* of March 1960, which outlined the progress in replanting and new planting throughout the country. Our analysis has gone a step further in that it shows what progress has been made in the adoption of the various types of improved material. It also demonstrates how tedious returns may still provide valuable information to ourselves, to the planting companies, and to the country in general. In addition, the R.R.I.M. is, to a degree, able to ascertain where its advice has failed to reach certain sections of the estate-owning groups.

We are much obliged to the Chief Statistician of the Federation of Malaya for his kind permission to extract the figures from his returns.

# Removal of Pigments from Latex for Pale Crepe Production

ONE OF THE MAIN QUALITIES required in a pale crepe is that it should be free from various pigments, notably the yellow carotenoid type of colouring matter present in varying amounts in natural rubber latex, the dark melanin formed by enzymic oxidation, and the brownish colour which occasionally forms in the crepe after some months of storage.

### YELLOW PIGMENT

The yellow pigment may be removed by the slow fractional coagulation, using acetic acid, of up to 30% of the rubber. This fraction contains almost all the yellow colouring matter and leaves a white latex

*Fractional coagulation of latex. Fractionation has been completed, the white uncoagulated latex removed and the yellowish lumps of coagulum, known as the 'first fraction', remain.*

*Emulsion 'A' Concentrate, in water, is added to the field latex before coagulation.*

which is coagulated and milled to give a white crepe (see *Planters' Bulletin 10*, January 1954, page 7). The yellow first-fraction coagulum is milled to give an offgrade pale crepe.

An alternative process, developed some years ago at the R.R.I.M., is to bleach the yellow pigment using Emulsion A concentrate which contains approximately 32% by weight of xylyl mercaptan as the active constituent; the concentrate is used at a rate of up to 24 ounces per 1000 pounds of rubber.

In recent years some 20,000 pounds of Emulsion A concentrate per year have been used, but the amount varies considerably with the demand for pale crepe and sole crepe. The use of this process enables a larger proportion of field latex to be sold as first grade pale crepe.

TABLE 1. QUALITY OF PALE CREPE PRODUCED BY BLEACHING ESTATE BULK LATEX WITH VARYING AMOUNTS OF EMULSION A CONCENTRATE

| *Test* | *Emulsion A Concentrate added per 1000 lb d.r.c.* | | | | | |
|---|---|---|---|---|---|---|
| | *1st Trial* | | | *2nd Trial* | | |
| | *5 oz* | *10 oz* | *15 oz* | *15 oz* | *17½ oz* | *20 oz* |
| Visual colour | Yellow | Pale yellow | Pale yellow | Pale yellow | Very pale yellow | White |
| Colour index | 38 | 32 | 22 | 15 | 13.5 | 12.5 |
| Mooney Viscosity* of raw rubber | 93.5 | 85 | 84.5 | 79 | 79 | 74 |
| Ash content, wt % | – | – | – | 0.13 | 0.16 | 0.15 |
| Iron content, p.p.m. | – | – | – | 21 | 21 | 25 |
| Williams Plasticity Test | | | | | | |
| Before ageing | | | | | | |
| $D_{10}$, mm | 5.2 | 4.6 | 4.0 | 4.4 | 4.1 | 4.1 |
| Recovery, mm | 6.7 | 6.2 | 5.1 | 5.7 | 5.2 | 5.3 |
| After 24 hr in oven at 100°C | | | | | | |
| $D_{10}$, mm | 3.7 | 3.5 | 3.1 | – | 3.7 | 3.0 |
| Recovery, mm | 5.6 | 5.0 | 4.0 | – | 5.5 | 4.2 |
| After 9 hr sunlight ageing | | | | | | |
| $D_{10}$, mm | 1.7 | 1.2 | 1.0 | 0.9 | 1.2 | 1.0 |
| Recovery, mm | 2.2 | 1.5 | 1.2 | 1.3 | 1.5 | 1.2 |

* A relatively low figure for Mooney Viscosity indicates increased softness.

the additional return often amounting to more than $500,000 (Malayan) per year.

Each batch of Emulsion A Concentrate made up for use in Malaya is tested at the Institute and any producer wishing to use the process is invited to carry out tests on small lots of rubber, in order to determine the optimum amount of bleaching agent required: bleaching will be inadequate if too little is used, but an excess will cause softening of the rubber.

In Table 1 we give the results of a typical test on an estate latex, using 5, 10 and 15 ounces of bleaching agent per 1000 pounds of dry rubber, followed by a further test using 15, 17.5 and 20 ounces.

The colour index method of Kidder has been modified to suit our needs and assist with the normal visual method of colour estimation. A value of less than 15 is usually obtained for a No. 1 pale crepe. From the results in Table 1, the advice given to the estate is that 20 ounces of Emulsion A Concentrate per 1000 pounds of dry rubber should be used. If more is used, a soft or even tacky product may be obtained.

*Softening Effect of Emulsion A Concentrate*

Table 2 gives the results of tests on bleached and unbleached crepes on three estates: the results for Estates A and B show how excessive addition of Emulsion A Concentrate can cause softening of the crepe. It is not, however, possible to recommend a rate of addition which will apply to all estates. The correct rate of addition for one estate may be excessive for another. Samples from Estate A and Estate B show

TABLE 2. EFFECT OF BLEACHING FIELD LATEX WITH EMULSION A CONCENTRATE. RESULTS FROM THREE ESTATES

| *Test* | *Estate A* | | *Estate B* | | *Estate C* | |
|---|---|---|---|---|---|---|
| | *Nil* | *16 oz 1000 lb d.r.c.* | *Nil* | *15 oz 1000 lb d.r.c.* | *Nil* | *15 oz 1000 lb d.r.c.* |
| Visual colour | Yellow | White | Yellow | White | Yellow | White |
| Colour index (19) | 36.5 | 12.5 | 24.5 | 12.0 | 29.0 | 8.0 |
| Mooney Viscosity | 80 | 68 | 62.5 | 56.25 | 81 | 78 |
| Ash content, wt % | 0.21 | 0.12 | 0.19 | 0.18 | – | – |
| Acetone content, wt % | 2.99 | 3.04 | 3.17 | 3.02 | 2.79 | 2.80 |
| Iron content, p.p.m. | 14.4 | 14.3 | – | – | 14.5 | 13.8 |
| Williams Plasticity Test | | | | | | |
| Before ageing | | | | | | |
| $D_{10}$, mm | 4.2 | 3.4 | 3.7 | 3.2 | 4.3 | 4.2 |
| Recovery, mm | 5.0 | 3.8 | 4.2 | 3.4 | 5.2 | 5.1 |
| After 24 hr in oven at 100°C | | | | | | |
| $D_{10}$, mm | 4.1 | 2.9 | 4.4 | 2.0 | 3.3 | 3.3 |
| Recovery, mm | 5.3 | 3.4 | 6.5 | 2.2 | 4.4 | 4.0 |
| After 9 hr sunlight ageing | | | | | | |
| $D_{10}$, mm | 1.5 | 0.7 | 0.9 | 1.3 | 0.8 | 0.7 |
| Recovery, mm | 1.6 | 1.7 | 0.9 | 1.4 | 0.8 | 0.8 |

appreciable changes in properties when the Emulsion is used, the rubbers becoming softer (lower Mooney Viscosity) and having less resistance to heat ageing (lower Williams Plasticity). This would be a disadvantage for sole crepe production and a reduction in the quantity of Emulsion added would be advised. In the case of Estate C, bleaching had no significant effect on the raw rubber properties and in this case the use of Emulsion A Concentrate at the 15 oz rate is not excessive.

It has been suggested that normal usage of Emulsion A Concentrate causes discolouration of the crepe on storage. This has not been confirmed and no case of grey or brown discolouration has been recorded in storage tests of samples in which the correct dosage has been used.

### GREY OR BLACK DISCOLOURATION

This discolouration is usually due to the reaction of an enzyme in the latex, polyphenol oxidase, with naturally occurring phenolic substances to produce the dark pigment melanin. A half-way stage in the reaction, giving a pink pigment, is occasionally encountered.

The formation of this pigment is adequately suppressed by the addition of sodium bisulphite to the latex as soon as possible after tapping, and this has been an estate practice for many years. This type of blackening is especially associated with certain types of latex: these include latex obtained from high tapping cuts, from yield-stimulated trees (up to about a month after stimulation), and from particular clones such as AVROS 49, Pil A44 and RRIM 615. Small amounts of sodium bisulphite may also be used to prevent this type of enzymic discolouration in sheet, for example in RSS 1 and particularly in air-dried sheet. The bisulphite is added to the latex or to the flooding water which is put in each coagulating tank when the coagulum is set. One third of a pound of sodium bisulphite per coagulating tank is usually adequate for this purpose.

### BROWN DISCOLOURATION ON STORAGE

In some cases, crepes that are very white initially turn slightly brown on storage or heating. This discolouration is thought to be associated with the amines naturally present in the latex. In cases where discolouration is severe, it has been found that large amounts of amines are present. Discolouration due to amines appears to be associated with certain metal ions.

Brown discolouration of the finished crepe can be overcome by either neutralising or precipitating the amine-type material, using formalin or oxalic acid. The former, however, causes darkening, whereas oxalic acid gives no undesirable side effects. Replacement of one-fifth to one-third of the formic acid coagulant with oxalic acid is now recommended to estates which have this discolouration problem. This has proved effective in most instances.

### CHOICE OF CLONES FOR PALE CREPE PRODUCTION

For pale crepe production, the latex must be predominantly white. Clones giving a yellow latex cannot be processed into pale crepe, because it is impossible to remove sufficient colour to give a pale crepe by fractionation and/or bleaching. Each new clone as it becomes available is tested for the colour suitability of its latex, that is, the intensity of the yellow colouring matter present and liability to enzymic darkening. The hardness of the rubber is also important, because a hard rubber can stand more bleaching without over-softening. From these two factors, the suitability for crepe manufacture is assessed and taken into account when planting recommendations are made. Table 3 gives the suitability for pale crepe manufacture of some of the newer high yielding clones, as compared with the older established clones Tjir 1, PB 86, Pil B84, and Gl 1.

TABLE 3. SUITABILITY FOR CREPE PRODUCTION OF LATEX FROM SOME OF THE NEWER CLONES

| *Clone* | *Colour* | *Hardness** | *Suitability*** |
|---|---|---|---|
| RRI 501 | Light yellow | S | C |
| RRI 513 | White | H | A |
| RRI 660 | White | H | A |
| RRI 605 | Yellow | M | D |
| RRI 607 | Yellow | H | D |
| RRI 623 | Pale yellow | H | B |
| RRI 628 | Pale yellow | H | B |
| GT 1 | Pale yellow | H | C |
| PR 107 | White | S | B |
| Tjir 1 | Pale yellow | H | B |
| PB 86 | White | M | A |
| Gl 1 | Pale yellow | M | B |

* As measured by Mooney Viscosity. H = Hard, M = Medium, S = Soft.

** A = Suitable. B = Suitable if fractionation or bleaching is used. C = Possibly suitable, provided fractionation or bleaching is used. D = Unsuitable.

# A Crown Budding Experiment

A CROWN BUDDING EXPERIMENT AT the R.R.I. Experiment Station, Sungei Buloh, will soon be ready to open for tapping. The object of this experiment is to find out the effect on the growth and performance of the trees of four different clones used in various combinations as crowns and trunks.

Four clones, Tjir 1, BD 5, LCB 870 and a clone of *Hevea spruceana*, were budded at normal height on seedling rootstocks in March 1952.

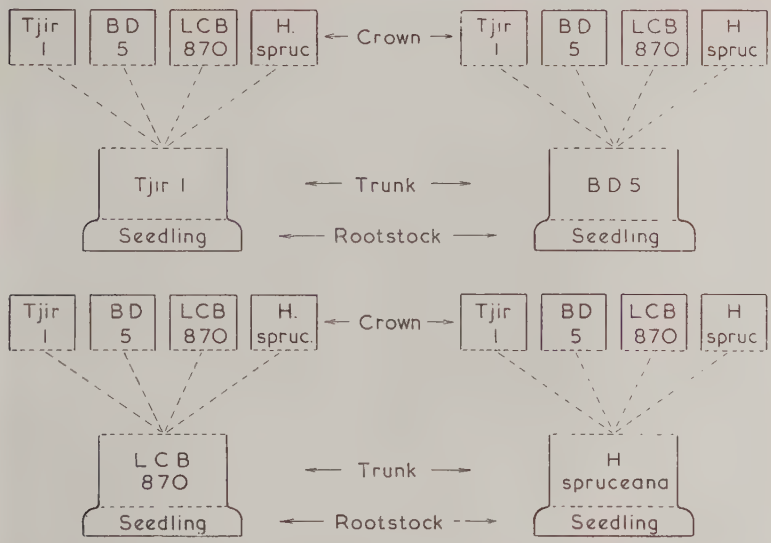



*Figure 1. The sixteen combinations of trunk and crown used in the experiment. The rootstock is a seedling in each case.*

In December 1953 these four clones were used to crown bud the young trees 6 ft above the first budding — resulting in sixteen different combinations (shown in *Figure 1* above) of trunk and crown. These clones were chosen to provide a wide range of vigour and yield potential.

*Figure 2. LCB 870 crown budded on a BD 5 trunk: mean trunk girth 19.6 inches.*

*Figures 2 – 4,* taken recently, show the condition of three of the combinations. It is clear that the clone used as the crown has a great effect upon the size of the tree and that the effect of the clone used as the panel or stem builder is less evident at this stage.

In *Figure 2* an LCB 870 crown is budded on a BD 5 trunk, and in *Figure 3* the position is reversed—a BD 5 crown is budded on an LCB 870 trunk. Mean trunk diameters are 19.6 in. and 13.8 in. respectively. Evidently the

*Figure 3. BD 5 crown budded on an LCB 870 trunk: mean trunk girth 13.8 inches.*

weakly growing BD 5 crown has retarded the girthing of the LCB trunk.

In *Figure 4*, where the vigorous LCB 870 is crown budded on a trunk of the same clone, the trees are only a little larger (20.8 in. mean girth) than where the weakly growing BD 5 is used as the trunk.

If South American leaf blight should ever become established in this country, crown budding with disease resistant clones might become an estate practice. As these resistant clones are poor yielding in comparison with recommended clones, we await with interest the first yield records from this experiment which will show whether the crown clone influences the yield of the panel.

Since the rootstocks used so far are variable seedling material, we have not been able to estimate the effect of the rootstocks on growth and yield. Now that some clones can be grown on their own roots from cuttings we shall be in a position to find out to what extent the rootstock influences the tree.

*Figure 4. LCB 870 crown budded on an LCB 870 trunk: mean trunk girth 20.8 inches*

## Cuscuta Australis. A Parasite of Cover Plants

A parasite obtains its food from other living organisms. Among the few parasitic flowering plants are the leafless, twining Convolvulaceae called dodder. The dodders form the genus *Cuscuta* and the only species found in Malaya is *C. australis* R. Br. Our

cover illustration shows a specimen from Dusun Durian Estate, Banting, Selangor, where it was growing on *Pueraria phaseoloides*.

The Malayan dodder has slender, twining, yellow to reddish stems, bearing suckers (haustoria) which penetrate the hosts' tissues. The plant can be termed 'leafless' for practical purposes, since its leaves take the form of minute scales. The small, creamy white flowers are found in clusters and the fruit are oval capsules.

*Cuscuta australis* is a parasite of *Mikania scandens* and it is thought that it may have been introduced deliberately into clearings and replantings in order to control *Mikania* by parasitism. Unfortunately, dodder also attacks desirable covers, for example, *Calopogonium mucunoides* and, in this case, *Pueraria*.

We are not yet able to recommend a selective weedkiller to control dodder. Meanwhile we advise eradication by manual means or by non-selective herbicides, and discontinuation of deliberate distribution of this parasite.

## Journal

The *Journal of the Rubber Research Institute of Malaya*, Volume 16, Part 2, contains four papers which are described below:

A. S. Cook. *The Short-Term Preservation of Natural Latex*. Communication 326.

Mr Cook was formerly a member of the R.R.I.M. research staff and is now at the Ministry of Commerce, Enugu, Nigeria.

His paper describes experiments to determine the quantities of anticoagulants required to keep fresh latex in a fluid state until the evening of the day of tapping and until the following day. The chemicals tested were: sodium carbonate, borax, ammonium and sodium phosphate, sodium silicate, sodium sulphite, sodium metabisulphite, sodium benzoate, sodium citrate, zinc sulphate, and formaldehyde alone and in combination with other chemicals. No new preservative was discovered but the effectiveness of established preservatives was reaffirmed.

Observations were also made on the appearance and properties of smoked sheet prepared from latex which had been kept fluid, by suitable additions of anticoagulants, until 6 p.m. on the day of tapping. Formaldehyde appeared to be the most effective of the substances added.

Similar observations were made on sheet from latex kept fluid until the day after tapping. Formaldehyde and sodium metasilicate were the most satisfactory combination.

The amounts of anticoagulant required differ from one clonal latex to another, and increased amounts are required for latex from wintering and wet trees. Practical recommendations have been detailed in *Planters' Bulletin 6*, May 1953, page 61.

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P.R. Wycherley. *Vegetation of Rubber Plantations*. Communication 327.

Whether the plants which grow between the rows of rubber trees are regarded as cover crops or weeds depends on the planter's opinion of their effect on the trees' performance. Sometimes cover crops, usually legumes, are sown; in other circumstances, the 'natural' covers which regenerate or invade are accepted. Experiment has confirmed the observation that *Imperata cylindrica* (*lalang*) is a pernicious weed, but in certain instances mixtures of

shrubs and creeping plants of the type found in regenerating rain forest can promote better tree performance than sown legumes.

The composition of the vegetation is influenced by many factors. Surveys of the vegetation in areas of varying history have been undertaken by botanists of the R.R.I.M. and the results of these surveys are summarised and reviewed in this paper. Emphasis is laid on the very different conditions which prevail in replantings today from those which obtained in 'jungle clearings'. Two factors, isolation from rain forest under monoculture, and the increased use of chemical and mechanical methods of weed control and cover crop management, appear to have worked together to impoverish the flora, so heightening the risk that undesirable species will predominate.

This paper, which was read at the Ninth Pacific Science Congress (Bangkok, 1957), indicates the lines of work now being pursued at the R.R.I.M. to elucidate some of the botanical problems involved in the management of cover crops.

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B.C. Sekhar. *The Soap Titration Method of Estimating the Particle Size of Hevea Latex.* Communication 328.

This communication describes the influence of various factors on the soap titration method for estimating the average size of latex particles. Temperature affects the results markedly. The values obtained for the average particle size at 22°C are approximately half those obtained at 30°C for the same sample of latex. At any one temperature, however, the method gives consistently reproducible results.

The average particle size of clonal latices measured at 22°C varies from 0.35 microns to 0.54 microns. Although there is no direct relationship between particle size of the latex concentrate and its mechanical stability, unstable latices generally possess smaller sized particles.

The particle size of latex increases before wintering and decreases after wintering, indicating a seasonal effect.

The communication also describes the changes in particle size that occur when a latex is stirred at high speed in the mechanical stability test. A sudden increase in size takes place well before the appearance of visible flocs which is the end point of the test.

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P.R. Wycherley. *Seed Germination of Some Tropical Legumes.* Communication 329.

The value of legumes in *Hevea* cultivation, still a matter for debate, is being actively investigated. Few planters would disagree, however, that the rapid establishment of a leguminous cover is often the best practical method of weed suppression and erosion control, for example after mechanised replanting.

One of the fundamental difficulties in legume establishment is that the seeds of many species are 'hard'. That is, they will not germinate without treatment. Effective treatment increases not only the percentage germination but also the rate of emergence; as a consequence, seeding rates can be reduced and the accelerated germination will be an advantage in the suppression of weeds.

This paper was presented at the Ninth International Botanical Congress (Montreal, 1959) and deals mainly with laboratory studies on the germination of seed of *Calopogonium, Centrosema, Flemingia* and *Pueraria.*

Among the conclusions of practical interest are: high humidity during storage reduces the viable seed fraction; the 'hot water' treatment is unreliable; mechanical scarification and hot glycerine treatment are promising alternatives to sulphuric acid treatment. Giberellin effected no useful improvement in germination. Irradiation with unscreened infra-red lamps had both stimulatory and depressive effects on germination. If further work shows which wave-lengths are responsible for the different effects, a novel method of seed treatment may be evolved.

## Patents: Low Ammonia Preservation of Latex

Two patents have been obtained by the British Rubber Producers' Research Association on behalf of the Rubber Research Institute of Malaya in connection with preserving systems for latex concentrate.

1. Latex concentrate of approximately 60% d.r.c. is preserved with 0.1% to 0.2% wt of ammonia and a secondary addition of 0.1% wt of sodium pentachlorphenate, together with 0.1% wt of a sequestering agent such as ethylene diamine tetra-acetic acid (EDTA). The system is described in British Patent No. 800,089 and has been employed for the commercial preservation of latex concentrate. Further details of this system may be obtained from the R.R.I.M.

2. In a process devised by Mr K.C. Sekar, B.A., A.I.R.I., formerly a member of the Chemical Division, one of the selenium compounds of dithiocarbamic acid, such as selenium dimethyl dithiocarbamate or selenium diethyl dithiocarbamate (also known as methyl and ethyl selenac respectively) is used as a latex concentrate preservative. The preservative is normally used in a concentration of 0.1% wt together with 0.2% wt ammonia. The system is described in British Patent No. 821,872.

## Natural Rubber Research Conference

Our May issue referred to the Natural Rubber Research Conference which will take place from 26 September to 1 October.

On the morning of Monday, 26 September, the staff of the Rubber Research Institute will be 'At Home' to those who have registered for the Conference. They will visit the laboratories in Ampang Road in the morning and the Experiment Station in the afternoon. Members of the Conference will also receive the final programme, outstanding documents and their admittance badges. They will complete registration for the sessions of the Conference they wish to attend.

The meetings will begin on the second day. The formal opening ceremony will be performed by the Minister for Commerce and Industry at the Dewan Tunku Abdul Rahman. This ceremony will include an address of welcome by the Director of the Institute.

After a short break, the Conference will hear the first of three addresses to be delivered by the official Conference guests. Our guests are three eminent research scientists, two of whom are no strangers to Malaya. Professor G.E. Blackman, F.R.S., Professor of Rural Economy at the University of Oxford, was here in 1956 at the invitation of the Rubber Producers' Council to act

as Chairman of the Committee whose report on research in the natural rubber industry bears his name. Professor Geoffrey Gee, F.R.S., Sir Samuel Hall Professor of Chemistry at the University of Manchester, came to Malaya in 1947 when he was the Director of Research for the British Rubber Producers' Research Association. The third official guest is Dr James Bonner, Professor of Biology at the California Institute of Technology. Dr Bonner, a well-known authority in several branches of plant biochemistry, has done pioneer work on the formation of rubber in plants.

Professor Blackman will speak on 'The Stimulation of Latex Flow by Plant Growth Substances', Professor Gee on 'New Methods of Elastomer Synthesis and Their Impact on Natural Rubber'. Dr Bonner's address will be on 'The Biogenesis of Rubber'.

The closing session will take place on the morning of Saturday, 1 October. The Controller of Rubber Research, Sir Geoffrey Clay, will give an address which may be expected to include an assessment of the work of the Conference. The Conference will be closed by the Assistant Minister for Commerce and Industry.

The formal opening, the three addresses by official guests and the closing session are all to be held at the Dewan Tunku Abdul Rahman. There should thus be ample seating for those who wish to attend any of these five general sessions. Applications may be made before 15 July to the Conference Secretary at this Institute.

## Retirement of MrG. Owen

We announce with regret the retirement on May 21st of Mr Gwilym Owen, Head of the Soils Division.

Mr Owen graduated at the University College of North Wales, Bangor, and obtained his M.Sc. degree in 1931 after becoming Soils Chemist at Harper Adams Agricultural College, Shropshire, where he gained experience in soils classification and mapping.

Coming to Malaya in 1935, he was at first with the United Sua Betong Rubber Estates Ltd as Soils Chemist. At this time he became interested in the fixation of phosphates in Malayan soils and this continued to be a project to which he devoted much time after joining the Soils Division of the R.R.I.M. in January 1939.

Mr Owen resumed duty in 1946, after being an internee in Sumatra during the War. He became Head of the Soils Division in 1954.

Papers he has published whilst with the Institute cover investigations into phosphate retention by Malayan soils, results of fertiliser experiments with rubber trees, and the classification of Malayan soils. In recent years, Mr Owen has given special attention to control of weeds and cover plants by chemicals.

Mr Owen represented the Institute at the Conference of the Rubber Research Institutes of the Far East at Bogor, Indonesia, in 1952, and at the Fifth International Congress of Soil Science, which took place in the Belgian Congo in 1954. In 1959 he visited Research Institutes in Vietnam and Cambodia.

Mr Owen's retirement after long and valuable service will be a loss to the Malayan rubber industry, and he will be greatly missed by all those who have known him personally. The staff of the Institute wish him a successful retirement.

## Publications of the RRI

To subscribe to all or any of our publications you should remit $15 (Malayan) to the Rubber Research Institute, P.O. Box 150, Kuala Lumpur, Malaya, together with your order.

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The management of each rubber estate over 100 acres in Malaya, North Borneo and Nigeria may apply for inclusion in our free mailing list. One copy of our *Annual Report* and *Planters' Bulletin* will automatically be sent gratis to each such estate, and a copy of the *Journal* if it is requested. Additional copies and back issues are charged for.

A price list, which gives details of all of our publications, is obtainable on request. A form is enclosed with the list for ease of ordering.

OUR COVER SHOWS THE LEAFLESS PLANT PARASITE CUSCUTA AUSTRALIS (DODDER) GROWING ON A COVER CROP, PUERARIA PHASEOLOIDES. THE PARASITE IS IN FLOWER. SEE NOTE ON PAGE 86.

*Photograph by L.W.*

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